

**Remarks**

Claims 1, 4-13, 15 and 16 are pending in the application.

Claims 1, 5, 7, 8, 10-13, 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Atia et al. ("Demonstration of Return-to-Zero Signalling...", IEEE Lasers and Electro-Optics Society, hereinafter "Atia") in view of Murakami et al. (U.S. Patent No. 6,307,985 B1, hereinafter "Murakami").

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Atia in view of Murakami and further in view of Ono et al. (U.S. Patent No. 6,097,525, hereinafter "Ono").

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Atia in view of Murakami and in further view of Tzukerman et al. (U.S. Patent No. 6,724,829, hereinafter "Tzukerman").

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Atia in view of Murakami and in further view of Fukuchi (U.S. Patent No. 5,745,613, hereinafter "Fukuchi").

Claims 19-20 have been added. Subject matter of both claims is fully supported by the original specification, and no new matter has been added.

Each of the various rejections and objections are overcome by various amendments and arguments that are presented.

Any amendments to any claim for reasons other than as expressly recited herein as being for the purpose of distinguishing such claim from known prior art are not being made with an intent to change in any way the literal scope of such claims or the range of equivalents for such claims. They are being made simply to present language that is better in conformance with the form requirements of Title 35 of the United States Code or is simply clearer and easier to understand than the originally presented language. Any amendments to any claim expressly made in order to distinguish such claim from known prior art are being made only with an intent to change the literal scope of such claim in the most minimal way, i.e., to just avoid the prior art in a way that leaves the claim novel and not obvious in view of the cited prior art, and no equivalent of any subject matter remaining in the claim is intended to be surrendered.

Also, since a dependent claim inherently includes the recitations of the claim or chain of claims from which it depends, it is submitted that the scope and content of any dependent claims that have been herein rewritten in independent form is exactly the same as the scope and content of those claims prior to having been rewritten in independent form. That is, although by convention such rewritten claims are labeled herein as having been "amended," it is submitted that only the format, and not the content, of these claims has been changed. This is true whether a dependent claim has been rewritten to expressly include the limitations of those claims on which it formerly depended or whether an independent claim has been rewriting to include the limitations of claims that previously depended from it. Thus, by such rewriting no equivalent of any subject matter of the original dependent claim is intended to be surrendered. If the Examiner is of a different view, he is respectfully requested to so indicate.

**Rejection Under 35 U.S.C. 103(a)**

**Claims 1, 5, 7, 8, 10-13, 15 and 16**

Claims 1, 5, 7, 8, 10-13, 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Atia in view of Murakami. The rejection is traversed.

Claim 8 has been canceled, and its rejection is therefore moot.

Claims 1 and 16 have been amended to further recite: "wherein dispersion management is provided by quasi-linear transmission of pulses with a very short duration compared to a bit period, and said pulses disperse very quickly as they propagate along said transmission medium."

Subject matter in these amended claims is fully supported by the original specification, e.g., page 8, 2<sup>nd</sup> full paragraph (i.e., lines 11 to 22) and by original claim 8. As such, no new matter has been added.

Atia teaches a method of improving receiver sensitivity by using return-to-zero (RZ) signaling with on-off keying (OOK) and differential phase shift keying (DPSK).

However, as stated in the Office Action, Atia does not teach that the optical transmission medium is dispersion managed. Thus, the Office Action cited Murakami for

teaching a dispersion managed medium using a combination of second and third order dispersion with mutually opposite signs (e.g., Fig. 1).

Applicants submit that there is no suggestion in Atia for combining with Murakami's dispersion managed medium, because Atia's teaching is directed solely to improving receiver sensitivity. Murakami's method of dispersion management is not of relevance to improving receiver sensitivity, and thus, one skilled in the art would not have found it obvious to combine Atia with Murakami.

Furthermore, Applicants submit that the combination of RZ-DPSK signaling in dispersion managed fiber transmission link was not obvious to one skilled in the art at the time of Applicants' invention. Specifically, a Declaration under 37 C.F.R. 132 and associated Exhibits are submitted to show the contrast in the number of reported activities of RZ-DPSK in fiber transmission, before and after the report of experimental results of the present invention at the 2002 Optical Fiber Conference (OFC 2002, FC2, p. 2 Exhibit A), one of the most well-attended conferences in optical communications technology.

As shown in the Declaration and associated Exhibits, there was no report of RZ-DPSK in fiber transmission link in the post-deadline session of OFC 2001, i.e., prior to Applicants' FC2 paper in 2002.

However, in 2003, the year after Applicants' report, 50% of the post-deadline papers (five out of a total of ten) in the Optical Fiber Transmission session at OFC 2003 relate to RZ-DPSK in fiber transmission. Specifically, the original FC2 paper submitted by Lucent Technologies, Inc. in 2002 was directly referenced in four of these post-deadline papers on RZ-DPSK (and indirectly referenced in the fifth paper). The fact that Applicants' method was widely adopted, referred to, and followed by Applicants' peers after the 2002 report provides convincing evidence of the non-obvious nature of the method.

Furthermore, as discussed in Applicants' specification, e.g., page 9, second paragraph, the advantageous use of RZ-DPSK encoding as shown by the Applicants was contrary to conventional approaches at the time of the present invention.

Finally, Applicants submit that, even if combined, Atia and Murakami do not teach each and every feature of Applicants' invention, as provided in amended claim 1.

For example, Murakami teaches a method of reducing the accumulated dispersion in an optical communication system by using a combination of positive dispersion fibers and negative dispersion fibers whose lengths satisfy certain relationships (e.g., Fig. 1 and col. 5, line 27 to col. 6, line 67).

However, nowhere does Murakami teach or suggest a method of dispersion management based on the signal pulse duration such as that of Applicants' claim 1 or claim 16, which provides "quasi-linear transmission of pulses with a very short duration compared to a bit period, and said pulses disperse very quickly as they propagate along said transmission medium."

As such, Applicants' claim 1 is patentable under 35 U.S.C. 103(a) over Atia and Murakami. Since independent claim 16 includes relevant limitations similar to those of claim 1, it is respectfully submitted that this claim is also patentable for at least the reasons discussed above with respect to claim 1.

Finally, since claims 5, 7, 8, 10-13 and 15 depend from claim 1 and recite additional limitations therefrom, these claims are also patentable for at least the reasons discussed above with respect to claim 1.

Therefore, the rejection of claims 1, 5, 7, 8, 10-13, 15 and 16 should be withdrawn.

#### **Claims 4, 6 and 9**

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Atia in view of Murakami and further in view of Ono.

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Atia in view of Murakami and in further view of Tzukerman.

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Atia in view of Murakami and in further view of Fukuchi.

The rejections are traversed.

Each ground of rejection applies only to dependent claims, and each is predicated on the validity of the rejection under 35 U.S.C. 103 given Atia in view of Murakami. Since the rejection under 35 U.S.C. 103 given Atia in view of Murakami has been

overcome, as described hereinabove, and there is no argument put forth by the Office Action that the additional references supply that which is missing from Atia in view of Murakami to render the independent claims obvious, these grounds of rejection cannot be maintained.

Therefore, Applicants' claims 4, 6 and 9 are patentable under 35 U.S.C. 103(a) over Atia in view of Murakami and further in view of the respective references of Ono, Tzuckerman and Fukuchi. As such, the Examiner's rejection should be withdrawn.

#### New Claims

Claims 19-20 have been added. Subject matter of these claims is fully supported by the original specification, e.g., on page 8, 3<sup>rd</sup> full paragraph (i.e., lines 23-31). As such, no new matter has been added.

Claims 19 and 20 depend from claim 1 and claim 16, respectively. For the same reasons set forth above, both claims are also patentable over the cited references.

#### Conclusion

It is respectfully submitted that the Office Action's rejections have been overcome and that this application is now in condition for allowance. Reconsideration and allowance are, therefore, respectfully solicited.

If, however, the Examiner still believes that there are unresolved issues, the Examiner is invited to call Eamon Wall at (732)530-9404 so that arrangements may be made to discuss and resolve any such issues.

Respectfully,

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